would descend along the "rest" with the uniform velocity of $\frac{30}{\sqrt{(\sin^3 \theta)}}$ feet per second.

We are now prepared to answer the query proposed by Mr. Lancaster as a crucial test of the validity of his theory, viz., "Will the tilted surface, supplied with the rest of two pounds and moving with uniform velocity, obey the impulse of an external force applied in its own plane with equal facility in any direction?"

The above formula for uniform velocity of descent indicates that, for all inclinations of the plane, there is an unbalanced force which acts downward and parallel with the face of the plane, and therefore toward the "rest." The tilted surface therefore will *not* "obey the impulse of an external force applied in its own plane with equal facility in any direction."

"The implication of the case" therefore is, that if an inclined plane is free to descend through the atmosphere, by virtue of its weight, it will, in consequence of the atmospheric resistance, move *laterally downward* unless it encounters a *current* of air that, being resolved by the under surface of the plane, gives a vertical component which is equal to or greater than the weight of the plane, in which case the plane will move horizontally or ascend; or if the plane is properly shaped it may, in consequence of "rear expansion" of the air, remain stationary with respect to the earth.

It follows that all of the observed phenomena of soaring are in accord with the recognized principles of mechanics, but I trust it is sufficiently obvious, from the preceding discussion, that a soaring bird is *not* "translated at right angles to the gravitating force, or horizontally, solely by the action of that force."

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EDITORS' TABLE.

EDITORS: A. S. PACKARD AND E. D. COPE.

—— Just as the inorganic appears to have preceded the organic in the history of the phenomena of nature, the inorganic preceded the organic as the most potent factor in the environment in which organic nature developed. Convulsions of inorganic nature were frequent and irresistible in the most ancient periods of time, and they diminished in number and importance as life

varied and multiplied. The conditions of the fitness essential to survival were thus originally those of physical endurance, and as life multiplied and inorganic nature receded in importance as a factor, these conditions came to depend more and more continually on intellectual development or adaptation to the wants of the most intelligent organisms. The most useful and successful man in the Plymouth Rock colony was he of the strongest arm and broadest shoulders, but the most useful and successful man of the metropolis to-day is he of the greatest business tact and shrewdness and the broadest human sympathies.

When we speak of the "survival of the fittest," it is obvious that we must keep before our minds a clear idea of the sense in which the words "survival" and "fittest" are used. If the conditions of a certain sense of the word "survival" pass away or indefinitely decrease in relative importance, we cannot reasonably expect to apply the word in that sense as if it were invariable. It is necessary, instead, to employ a more constant and general signification of the word.

If there were no universal and overwhelming convulsions of nature after the arrival of the highest members of the scale of animal life at a plane of absolute intelligence, we are warranted in supposing that the most intelligent mammals, at least, were capable of preserving themselves from destruction and burial by the lesser convulsions of nature that occurred from time to time.

Moreover, if we assume, for the sake of argument, that man descended from the highest development of anthropoid apes whose existence in prehistoric times is known, we must admit the occurrence of a considerable interval between the cessation of such convulsions of nature as were likely to bury and preserve the remains of anthropoid apes and the attainment by the anthropoid of a sufficient degree of intelligence to suggest the burial of the dead in a manner calculated to preserve their remains for modern scientific inspection.

The longer this intermediate period is supposed to be, the greater the intellectual development which, under the laws of evolution, should take place in the course of it. The reasonable inference is that the greater the gap between the highest known form of anthropoid ape and the lowest known form of man, the more important, relatively, must have become the social and moral conditions of development, while the physical conditions

dwindled in importance during the period represented by that gap.

If, mathematically speaking, we let *m* represent the product of physical conditions in effecting the variation and development of the organism, and *n* the product of social and moral conditions, we find that *m* varies inversely as *n*. If *m* be infinite and *n* infinitesimal, as at first, and *m* continually diminishes while *n* increases according to definite laws, the attainment of a point at which *m* is infinitesimal and *n* infinite is only a question of time.

The conditions of any possible development of man from anthropoid apes appear therefore to require that there *should* be a "missing link," in the sense that physical evidences of intercalary types are unpreserved. The "survival" of the fittest, at a certain period in the history of life, means exactly such survival as would make it improbable that many remains should be preserved, and this survival only the fittest would, under the circumstances, attain. Such anthropoid apes as were capable of generating man should have been superior to those whose remains were preserved because they had not intelligence enough to protect their lives. The first considerable preservation of primitive man would begin when he ventured on navigation; but his remains so preserved will be "missing," until such time as "the sea gives up her dead."

—— The committee of Congress which has been investigating the U. S. Geological Survey has not dealt kindly with Major Powell and his charge. There is no intrinsic reason why Congress should not be favorable to the Geological Survey, but there is probably no department where it is less likely to tolerate abuses. We cannot say that the survey has been entirely free from faults of this kind. If Major Powell is carrying any Jonahs he had better relieve himself of them.

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RECENT LITERATURE.

A HAND-BOOK OF PLANT DISSECTION.[1]—This long-promised work has at last appeared, and we have no doubt that it will be welcomed by laboratory workers throughout the country. It is apparently an entirely original work, no statements being made at second hand, and no directions for work being given which have not been *actually worked out* by the authors themselves. One finds evidence of this original work on almost every page, and this fact alone will commend the book to all teachers and to every pupil who wishes to become an investigator in structural botany.

[1] *Hand-Book of Plant Dissection.* By J. C. ARTHUR, M.Sc., botanist to the New York Agricultural Experiment Station; CHARLES R. BARNES, M.A., professor of botany in Purdue University, and JOHN M. COULTER, Ph.D., professor of botany in Wabash College; editors of the *Botanical Gazette.* New York, Henry Holt & Company, 1886, pp. XXII, 256, 12 mo, with two plates.